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Project 1

Title – Dakota Flavor Marketplace
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Project Summary

This project attempted to increase the exposure of specialty crops and specialty crop products to consumers in order to increase their awareness of specialty crops that are available in South Dakota. The project also attempted to increase cooperation among specialty crop producers. All of the activities took place at the Dakota Flavor Marketplace at the South Dakota State Fair.

Project Approach

At the 2007 South Dakota State Fair, 19 companies participated in the Dakota Flavor Marketplace, including 7 South Dakota wineries. We produced 30-second television vignettes for 7 of the specialty crop producers, airing the week before the State Fair and encouraging consumers to come see these producers at the State Fair.

A semi-permanent wine pavilion was set up for the wineries (meaning that it can be moved and utilized for other wine tasting events but will stay permanently at the State Fair). We were able to feature 7 wineries and 26 South Dakota wines. Along with the wine pavilion, we had a special event, "Till the Cows Come Home" on Friday evening with specific consumers invited. This wine and food tasting went over very well with those in attendance. It gave consumers a chance to taste some unique, specialty foods and wines that are grown and made right here in the state.

The SD Chef's Association also held three chef demonstrations at the State Fair featuring South Dakota specialty foods. These demonstrations were very popular and allowed South Dakota consumers to see how they can prepare unique dishes with locally grown food – more than just meat and potatoes. The unique collaboration with the Chef's Association also served as a means to encourage chefs to use more specialty foods from South Dakota in their dishes.

Five chefs demonstrated recipes using local specialty crops at the chef demonstrations. Producers also had a chance to speak about their produce and answer consumers' questions. Over 1,000 people watched the demonstrations throughout the day. Specialty crops used were: tomatoes, apples, onions, potatoes, sweet corn, cabbage, beans, carrots, peppers, beets, and cantaloupe.

The wine tasting at the 2007 State Fair was so successful that we expanded it in 2008. Attendance was much higher than we expected. People were actually waiting in line for 30-60 minutes to sample the wine. Our area in 2007 was about 15 ft by 50 ft. In 2008, we moved into an entire building. The wineries have also been very pleased with their sales for the event and for the exposure they get from all of the fairgoers.

As mentioned, in 2008, we moved the SD Wine Pavilion to its own building on the fairgrounds. This larger building allowed for more wineries to participate and showcase even more wines. It also led to a better, more relaxed environment for consumers as they could more leisurely taste and sample the wine.

In 2008, we had 11 South Dakota wineries participate showcasing over 40 varieties of wine. We utilized the existing wine pavilion (from 2007). We also conducted a survey of the wine tasters and found that most of them had tried South Dakota wine, but a majority of people had never visited a South Dakota winery. Anecdotally, we also learned that most people have no idea that there are 16 licensed wineries in South Dakota – most of them only know about two or three wineries – at the most. Overall, people rated their experience at the wine pavilion a 4.5/5.

Goals and Outcomes Achieved

We had 19 companies participate in the Dakota Flavor Marketplace in 2007 and 13 companies in 2008. Two companies had to cancel at the last minute in 2008, one due to crop failure.

The companies in 2007 included: Dakota Exotics, Simply Beelightful, Designs by Sharon, Melons N More, Rosebud Manufacturing, Teno's Tacos, Elegant Accents, My Best Products, Bijou Hills Grass Fed Beef, Kerri's Creations, Soy Essence Candles, Hilda Arbieter, Wilde Prairie Winery, Prairie Berry Winery, Dakota Falls Winery, Strawbale Winery, Hahn Creek Winery, Valiant Vineyards, and Schade Vineyards.

Specialty crops that these companies represent include: honey, vanilla, grapes, watermelons, muskmelons, strawberries, apples, chokecherries, raspberries, black currants, and cherries.

The companies in 2008 included: Dakota Exotics, Simply Beelightful, Teno's Tacos, Purity Seeds, Dakota Valley Products, Dakota Horizons Girl Scouts, Midwest Dairy, Ron's Beef, Pork and More, Personalized Gifts Galore, SD Heritage Fund, Window Shop, Midwest Seed Genetics, and Martha's Crafts.

Each company in the Dakota Flavor Marketplace was given a booth to display and sell their products. In 2007, when the wineries were in the Dakota Flavor Marketplace building; all of the wineries had a shared space in order for tasting out the wines.

We also had 11 wineries participate in the wine pavilion: Black Hills Winery, ChirsaMari Estates, Dakota Falls Winery, Hahn Creek Winery, Prairie Berry Winery, Schade Vineyards, Strawbale Winery, Syverson Vineyard, Valiant Vineyards, Wide Sky Wines, Wilde Prairie Winery.

Specialty crops that these companies represent include: honey, grapes, plums, chokecherries, red currants, peppers, black currants, strawberries, rhubarb, apples, pears, raspberries, and elderberries.

Over 150,000 people attended the fair in both 2007 and 2008. We know that approximately 5,500 people participated in the wine tasting event over the two-year project. People were given tickets for each sample of wine and based on the number of tickets given, we could estimate the number of people who sampled wine.

We also surveyed attendees in 2008 to gauge their awareness of the wine industry. See the survey results below under 'Other Additional Information'.

The most exciting result of the Chefs' Demonstrations was that the producers had a chance to meet with executive chefs from some of South Dakota's largest restaurants as well as executive chefs from the to largest hospitals. All have expressed a desire to use more local produce.

The executive chef of the Sanford Hospital in Sioux Falls now has an open door policy for South Dakota producers. He has stated that they can call him direct and he will try to work with them. He has a policy of buying local whenever he can.

Beneficiaries
South Dakota specialty producers benefitted from exposure to consumers, increases in industry awareness and increased sales because of their participation in the Dakota Flavor Marketplace at the SD State Fair.

Lessons Learned
It seems that the wine industry has had the most success from this event. We have worked on getting other types of companies involved such as fruit, honey, and vegetable producers. However, there isn't a high amount of interest from the other producers. It seems the less perishable, more processed products such as wine, honey, etc. are more conducive to the State Fair than more perishable products such as tomatoes or apples.

Other Additional Information
2008 Survey Results

- Gender 68% female; 32% male
- Average age – 50
- 30% of survey takers attended the 2007 wine pavilion and 70% had not visited the wine pavilion before
- 80% had tried South Dakota wine before while 20% had not
- 43% of survey takers had visited a South Dakota winery before while 57% had not
- Overall, survey takers rated their experience a 4.5 out of 5

- 88% of survey takers said the wine pavilion influenced their opinion of South Dakota wine

Future Project Plans

We plan to continue the SD Wine Pavilion at the South Dakota State Fair. It is a very popular event with fair-goers and an excellent way to promote South Dakota wines and the South Dakota wine and grape industry to consumers. We have had positive comments from both the industry and consumers encouraging us to keep this event going.

In March 2009, we expanded the wine pavilion to Deadwood, SD for one weekend. The event was not as successful as the State Fair event – likely due to venue location and other reasons. But we have hopes of bringing the SD Wine Pavilion to other locations/venues in the future.

A dish featuring South Dakota grown produce

Chefs cooking with South Dakota grown produce

Enticing State Fair-goers enjoy watching the chefs' demonstrations

A chef cooking up a meal with a bounty of South Dakota produce

Enticing State Fair-goers to come into the South Dakota Wine Pavilion

A tasting station featuring South Dakota wines

Learning about the South Dakota wine industry

Sampling South Dakota wines

A satisfied customer

Project 2

Title - Enhancing Wine Grape Productivity: Growers Workshop Series

Contact Person – Rhoda Burrows • 605.394.2236 • Rhoda.burrows@sdstate.edu

Project Summary

A reliable supply of quality wine grapes is essential to continued success of the South Dakota winery industry, but very few of our growers have education or experience in producing quality fruit for wine. This project will help increase the success of the industry through a series of workshops that helped new and prospective growers understand the commitment of time and resources necessary for successful wine grape production, as well as providing hands-on training in the management techniques critical to producing high-quality fruit.

Project Approach

Three workshops were held in 2008. Two in March 2008 – one at Strawbale Winery and one in Brookings, SD. A third workshop was held in Rapid City in April 2008. In addition, a renovating vines session was held in Mobridge in April 2008.

In March 2008, we offered a grape-pruning workshop, with Dr. Paul Domoto, from Iowa State University, at Strawbale Winery. Attendance was limited in order to facilitate audience participation in this field demonstration; about 30 persons were present. Weather forced a planned pruning workshop indoors in Rapid City in early April; a follow-up session was held in the vineyard a week later, with about 15 persons attending each session. A demonstration of renovating neglected vines was also done at Mobridge in April. One attendee who has grown grapes for a number of years remarked after the Strawbale workshop, "this was an excellent workshop - this is the first time I really understand what this balanced pruning means." Helping the growers with this issue should help improve grape fruit quality for our industry.

An all-day indoor workshop was held in Brookings in March 2008 for beginning and advanced growers, with Dr. Paul Domoto from Iowa State University as a featured speaker; 68 people attended the workshop. Primary foci of the workshop were managing soils, and balancing vine growth for optimal berry quality. A number of the presentations from the workshop have been posted on our website (http://sdgrapes.sdstate.edu). A vineyard work schedule was also written and is available from SDCES for printing from the website, or hard copies are available from horticulture extension educators or specialist. A poster highlighting the viticulture industry and SDSU educational programs was created and displayed at Dakotafest and at the SD State Fair.

In March 2009, a two-day workshop was held in eastern South Dakota and a one-day workshop was held in western South Dakota, in Belle Fourche.

On the eastern end of the state, a grape-pruning workshop, with Drs. Paul Read, from University of Nebraska, and Anne Fennell from SDSU, at Tucker's Walk Vineyard near Sioux Falls. Attendance was limited in order to facilitate audience participation in this field demonstration; about 30 persons were present. This was followed up by an all-day workshop the next day, also with Drs. Read, Fennell, and Burrows presenting topics including balancing fruit and vine

growth for quality fruit, grape cold-hardiness, spray damage issues, and resources for growers. This workshop was co-sponsored by the South Dakota Cooperative Extension Service and the SDSPA.

A pruning workshop was also offered in Belle Fourche, with Dr. Paul Domoto from Iowa State University demonstrating balanced vine pruning to 20 growers. This was followed up by a viticulture and enology workshop the next day attended by 43 growers. This was co-sponsored by the Black Hills Grape and Berry Growers Association, the SDSPA, the South Dakota State University Cooperative Extension Service, the Belle Fourche Chamber of Commerce and the South Dakota Department of Agriculture. Topics included vineyard basics and advanced management, other fruit that can be grown for wine in South Dakota, marketing to wineries; and enology topics such as acidity and pH, harvest maturity effects, and more. Dr. Fugelsang, an enologist from University of California-Fresno presented enology topics, while Drs. Domoto and Burrows presented viticulture and fruit culture topics; winery and grape growers participated in several Q&A panels.

Goals and Outcomes Achieved
A publication “Soil Sampling for South Dakota Vineyards” is in the process of being published through the South Dakota Cooperative Extension Service; this is an outcome of the workshops. The publication will be distributed via the Extension website and as pdf’s sent in response to grower inquiries to extension educators at the county and state levels. It will also be available at hard copies at various grape extension workshops or meetings.

One attendee who has grown grapes for a number of years remarked after the Strawbale workshop, "this was an excellent workshop - this is the first time I really understand what this balanced pruning means." Helping the growers with this issue should help improve grape fruit quality for our industry.

Follow up surveys will be conducted with workshop participants in the fall/winter of 2009 to determine how many have developed a business plan as a result of the workshops and how many have started or expanded their vineyard.

Beneficiaries
Over 200 people have attended the workshops and seminars offered under this project. Attendees at the workshop tend to be about 50% prospective growers and 30% new growers (1-2 years), 10% experienced growers, and 10% extension personnel or other allied support (eg NRCS, etc.)

Lessons Learned
N/A

Dr. Paul Domoto at the pruning workshop at Strawbale Winery's vineyard in March 2008.

Project 3

Title – Feasibility and Effectiveness of Micro sprinkler Frost Protection

Contact Person - Garrett Rahm • 605.897.6628 • garrett.rahm@gmail.com

Project Summary

Early spring and late fall cold damage to growing grape vines is a significant factor in the overall yield and year-to-year productivity of grape vines. Sub freezing temperatures (less than 31F) may damage emerging buds in the spring or significantly shorten the growing season in the event of an early killing frost in the fall. Reducing the amount of damage will increase overall vine yield and fruit quality. Finding low cost, environmentally sound, and sustainable methods of frost protection could offer growers in the Midwest a significant tool for ensuring a quality crop through harvest. Research was conducted to determine the effectiveness of targeting water application directly to the vines by means of micro sprinklers (Netafim™ StripNet 18 inch wide spray over trellis) to avoid frost and cold damage to grape vine buds in the spring as well as leaf and canopy injury in the fall.

Project Approach

By later summer of 2007, sprinkler installation had been completed 100% on all Frontenac, Frontenac Gris, and is 33% complete on the Marquette rows. Sprinklers spaced at 15 feet in two rows and 10 feet in one row of each variety. This served to demonstrate the sprinkler's emission uniformity and the possible benefit of closer spacing to frost prevention effectiveness.

Installation of sprinklers on the Valiant rows was delayed until early 2008 due to the advanced stage of growth in late 2007.

A more comprehensive weather station was purchased from Spectrum Technology, as I felt it would be necessary to measure the dew point and wind speed in addition to the temperature at the vineyard canopy. Knowing these additional factors aids in activating the sprinklers in a

timely manner, to not damage the plants by turning on the sprinklers too late or wasting water by turning them on too early. Measuring the wind will be important, as the sprinklers produce a fine mist, which is easily moved off target by even slight breezes, thus reducing the overall effectiveness of the sprinkler system.

Frost protection was attempted on several occasions throughout the fall of 2007 and 2008, however on the evenings when frost was forecasted, temperatures never dropped to damaging levels and no vine damage was observed on control (un-treated) grapevines. The killing frost came late in October, well after fruit would have been harvested, and after frost protection would have been desired. The late frost and mature state of the vines convinced me to not conduct any further tests and allow the vines to go completely dormant.

Spring of 2008 presented no usable data from the attempted frost protection events. Temperatures never dropped to levels that would damage the plants and an extension of the project was requested until June 30, 2009 – thus allowing another spring to attempt observations. Frost protection was attempted on several occasions throughout the fall of 2008; however, on the evenings when frost was forecasted, temperatures never dropped to damaging levels and no vine damage was observed on control (un-treated) grapevines.

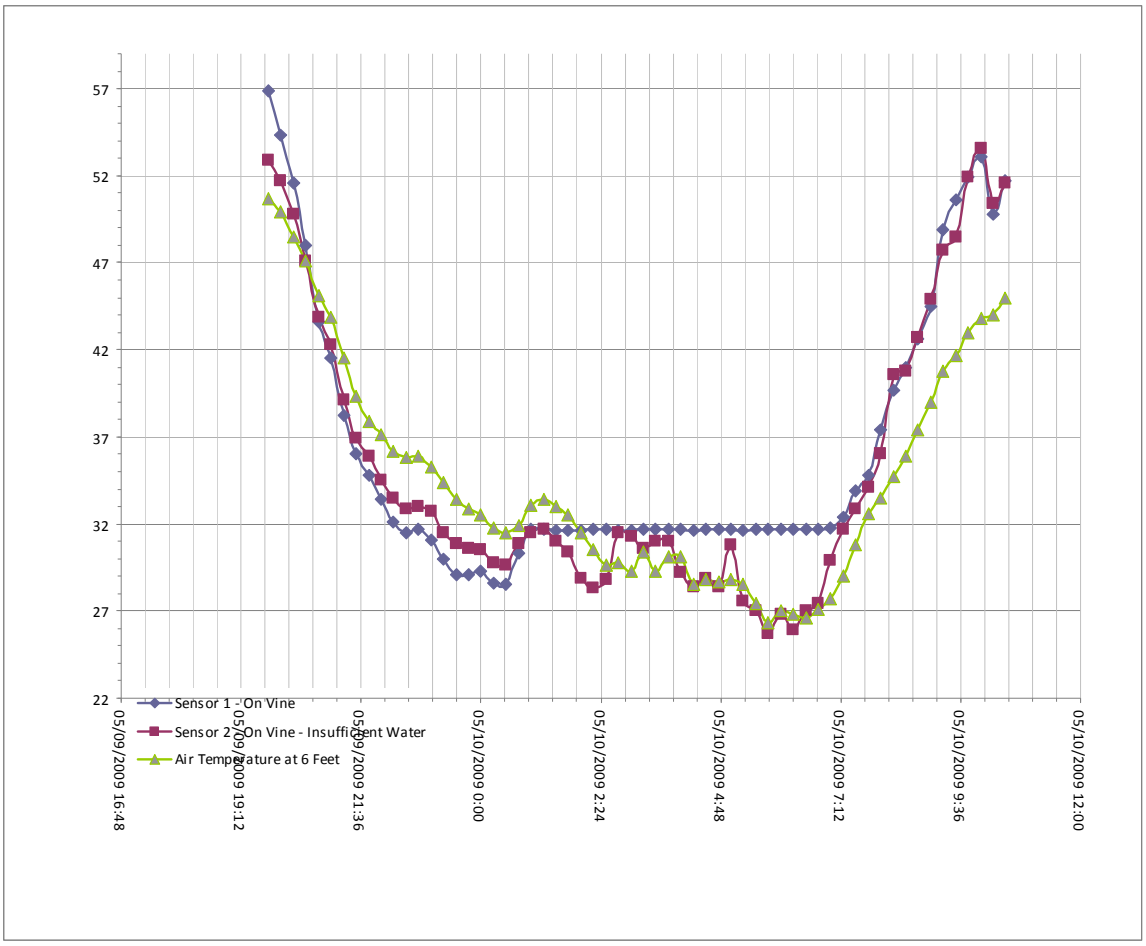
At 12:00 AM on May 10, 2009, the sprinklers were activated, temperature readings at my residence were about 34 degrees; however, at the vineyard they were 32.5. Upon starting the sprinklers, several of the nozzles plugged with a “slush” type slurry of ice and water. The “slush” may have formed due to the irrigation lines being on the ground, where the coldest air would accumulate first. Steps were taken to return as many nozzles to operation as possible.

The air temperature eventually fell to 26.3 degrees Fahrenheit. Temperature sensors mounted on the vines recorded temperatures as water was being applied. Sensor 1 was located in a position where ice accumulation occurred continually throughout the night. Sensor 1 never dropped below 31.7 degrees Fahrenheit, while water was being applied. Sensor 2 was placed at the other end of the same vine, in an area which appeared to receive less or intermittent water. Sensor 2 recorded varying temperatures depending on the water spray it received. This shows that distribution of the water may not adequately provide frost protection to all parts of the vine.

Frost protection was turned off after nine (9) hours, when the air temperature reached a level that provided adequate melting of the accumulated frost.

The graph shows the recorded data from the weather station on May 9-10, 2009, as a frost event was taking place. The green line (triangle) represents air temperature at 6 feet, the blue line (diamonds) represents Sensor 1, which was located on the vine and under ice, and Sensor 2 (squares), which was located on the vine where water application seemed insufficient.

Sensor 1 begins a sideways trend shortly after midnight, May 10, 2009. This shows that water application from StripNet sprinklers was providing sufficient protection to the plant’s growing points. Sensor 2 registers an irregular pattern, as constant water application was not taking place on the vine at its location.



Goals and Outcomes Achieved

Per the goals outlined in the original proposal:

1. StripNet sprinklers have shown the capability to cover the vines in ice and protect to temperatures down to about 26 degrees Fahrenheit. The use of sprinklers in the fall may not be necessary in most Midwest growing situations.

2. In the days following the freeze, observations were made as to bud survival between control plants and frost protected plants. There appeared to be few distinguishable differences between observation points. This may be largely because the vines were not at a highly susceptible stage of growth and the temperature did not drop below the LT50 temperature of 26 degrees F. I believe that the sprinklers would have provided sufficient protection had the plants been at a more susceptible stage of development.

3. Fixed Costs

Sprinklers turned on

Ice formation prevented temperate from dropping below 31.7.

Item	Quantity		Total Cost
Nozzles (StripNet)	363		$1216.00
Hose (feet)	3630		$218.00
Misc. plumbing fittings	NA	NA	$100.00
Labor (hours)	16	$30/hour	$480.00

		Total:	**$2014.00**

Variable (Annual) Costs

Item	Quantity	Unit Cost	Total Cost
Water (50 hrs. of oper.)	96250 gallons	$2.60/one-thousand gal.	$250.00
Maintenance	5 hours	$30.00/hour	$150.00
		Total	**$400.00**

Beneficiaries
Data from this project was emailed to 16 South Dakota vineyards and wineries. Data was also shared with the South Dakota Cooperative Extension Service.

Lessons Learned
Installation of the water hookup was not completed in time to begin conducting tests during the 2007 spring, due to grant fund availability – as the proposal called for – testing was attempted during the spring of 2008 and 2009.

Adjustments to the existing water supply sub-mains were made to compensate for the additional water requirements of the sprinklers, and installation of the WEB Rural Water tap was completed by a WEB contractor on August 6, 2007. The water supply from this hook-up provided sufficient water flow, but inadequate pressure, as such, a water reserve tank was not necessary, but a portable booster pump (in-kind) was required. Two hundred feed of 1.5" irrigation hose (in-kind) was utilized to supply the vineyard from the hydrant and a customized irrigation manifold was installed to split the water flow to the separate vineyard blocks and Y-splitters and valves were added to the existing drip irrigation system to facilitate feeding water to the StripNet sprinklers.

Early spring of 2009 presented several challenges. There was a great deal of repair work to complete in the vineyard on the small quarter inch hoses, which rise from the ground to the sprinkler heads. The rabbits chewed about 20% of the tubes – rendering them useless until repaired. This required hours of labor and testing to ensure that not skips had been made and that no water leaks existed. The vineyard also suffered some severe setbacks from the winter. There was one week during February 2009 of extremely low temperatures (less than -30 F) which caused some bud mortality on the Frontenac, Frontenac Gris, and Marquette. Some re-training was required during the spring to compensate for this.

Other Additional Information
Summary of Findings

- StripNet sprinklers are water-efficient and easy to install and maintain in conjunction with existing drip irrigation systems and water sources.

- The use of sprinklers in the fall may not be necessary in most Midwest growing situations.
- StripNet sprinklers have shown the capability to cover the vines in ice and protect to temperatures down to about 26 degrees Fahrenheit.
- Wind may cause spray from StripNet sprinklers to blow off target and cause reduced performance for frost protection.
- Closer spacing between sprinklers may be beneficial in uniformly covering the vines with ice.
- Careful timing is required during start-up of StripNet sprinklers to ensure that frost/slush formation has not occurred in the water lines.
- Cost-benefit calculations are highly specific to each grower's situation and as-such need to be assessed in the exact context of a vineyard's needs.

Ice accumulation on the vine

Adapting existing drip irrigation to feed StripNet sprinklers